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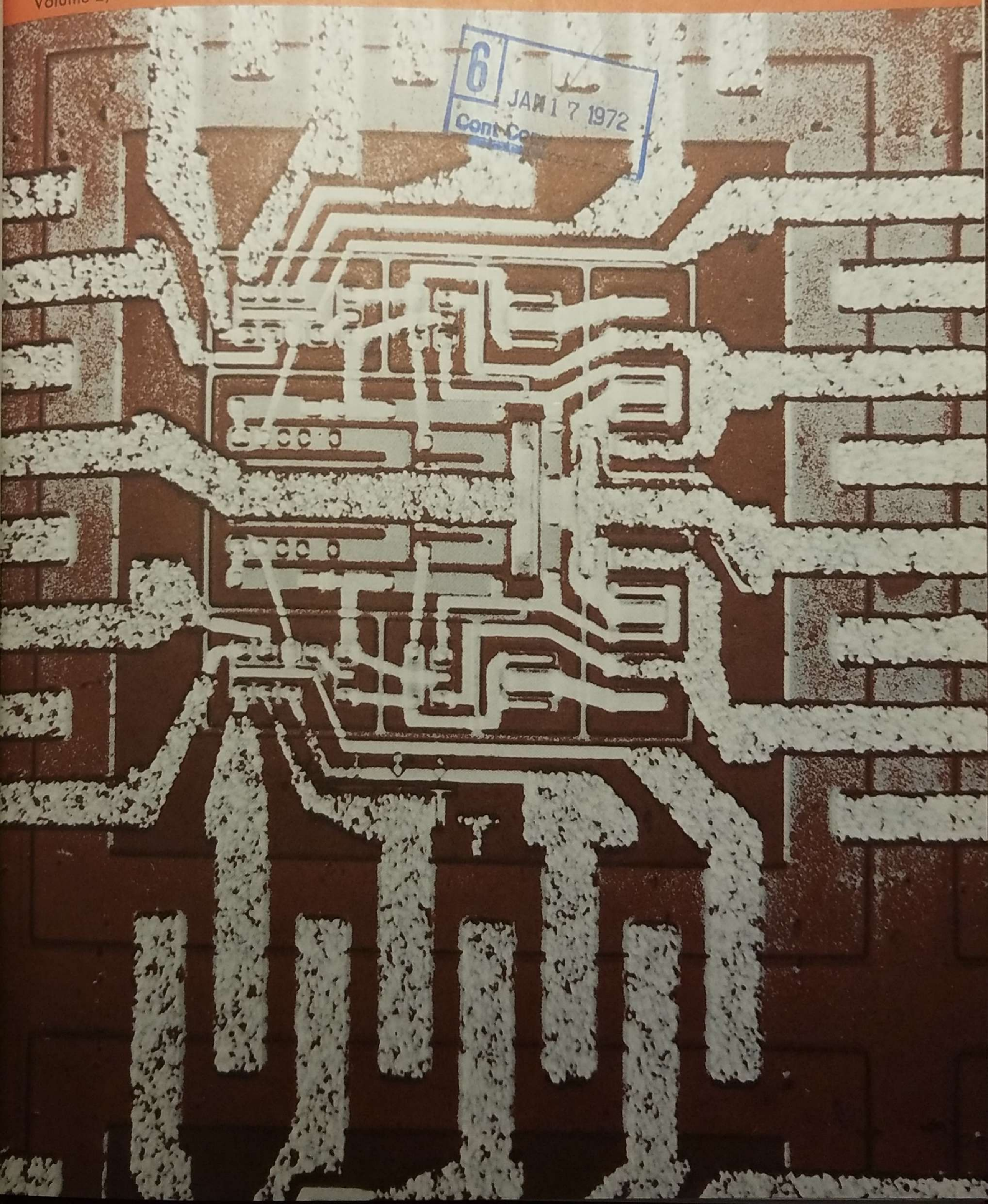

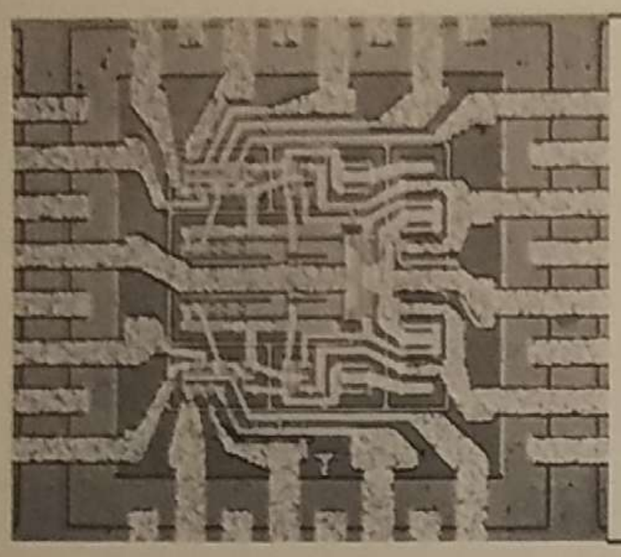

On The Cover

Lilliputian integrated circuits—specks of crystal that carry complete arrays of electronic components—are making the miniaturization of digital computers increasingly possible. Photomicrograph shows a single beam-led circuit which was developed by Bell Telephone Laboratories. Although it includes 10 transistors, 18 diodes, and 12 resistors, its actual breadth is only .053 inch from beam tip to beam tip.

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EDUCOM's Position on Copyright Changes

In order to devote as much space as possible to a matter of enormous importance to higher education, the proposed new Copyright Act now before Congress, EDUCOM has abandoned for this issue its usual illustrated format. The following resolution was approved unanimously by EDUCOM Trustees and representatives to the Council, who emphasized, however, that their action did not bind member universities.

With the purpose of securing (a) a proper adjustment of the interests of authors, publishers, and educational users, and (b) a proper contribution of the computer to the educational life of the nation, we recommend that the current version of the Copyright Revision Bill (S. 597, 90th Congress, First Session) be clarified and amended to accomplish the following:

1. Any copyright applicable to a computer program shall not extend to the process embodied in the program, and a user shall be privileged to replicate the program in order to carry out the process.

2. In accordance with traditional American copyright policy, reasonable exemptions for copyright restrictions shall be allowed to nonprofit educational, research, and library institutions in regard to their utilization of copyrighted works in computer operations. The relevant exemptions provided in S. 597 are not adequate and would seriously hamper educational development in this country.

3. In recognition of the fact that computer technology and utilization are changing at a rapid rate and the effects of copyright regulations in this field are necessarily problematic, S. 597 should provide for appropriate administrative mechanisms by which the law may be rapidly adjusted to meet conditions as they arise.

by BENJAMIN KAPLAN and ARTHUR R. MILLER

Computers and the Copyright Bill

WHEN THE PRESENT COPYRIGHT ACT WAS ENACTED in 1909, phonograph records and motion pictures were in their infancy. Magnetic tape, television, photocopying, communication satellites, and computers were unknown. Moreover, teaching did not involve audiovisual devices or the extensive use of up-to-date copyrighted materials.

Many definitions and concepts in the 1909 Act, which has remained virtually untouched, became increasingly obsolete over the years.

Since 1955, pressure for a complete revision of the Copyright Act has been mobilized, and the matter has undergone considerable study and discussion. The Copyright Office conducted hearings, as, after revision bills were introduced in Congress, did the House and the Senate.

The House passed its Bill, and final Senate action is expected this year, or at the latest, in 1968. Any revision is bound to affect dramatically the work of educators, computer users, and the authors and users of computer programs.

Although computers are not mentioned in the current Act, it seems certain that whether computer activities infringe on copyrights would be judged by the same standard as other forms of copying and performance. Since the word "copy" is not defined in the present statute, it is unclear how broadly the courts might apply it in situations that involve the use of copyrighted materials in computers.

The Supreme Court once held in another context that before there can be a violation, a person must be able to *read* the "copy." Thus, punch cards, magnetic tape, and other machine-readable versions of copyrighted materials arguably are not infringing "copies."

This decision was rendered more than half a century ago, however, and makes little sense in the light of modern technology. Furthermore, punch cards and magnetic tape can be deciphered by some people just as sheet

music can, meaning that the input of copyrighted materials into a computer might well be considered a "copy" under existing law.

Memory cores and magnetic discs, on the other hand, cannot be read and, if the courts persist in retaining the "susceptible of being read" requirement, would not be "copies."

Computer output in the form of a tangible printout obviously is a "copy" within the meaning of the 1909 Act. If the output consists of sound or a visual display on a cathode-ray tube, probably it would constitute a "performance" under the Act or, in the latter case, a "copy."

THE PROPOSED REVISION OF THE COPYRIGHT LAW CURrently being considered provides for the protection of computer programs and the protection of copyrighted programs in computer operations conducted by nonprofit educational, research, and library institutions. EDUCOM believes these provisions in their present form will seriously hamper education. What follows is an analysis of the Bill's impact upon the developing role of computers in instruction and research, and suggestions as to how the Bill could more fairly protect authors and publishers and, at the same time, permit the full application of computers to the advancement of education.

A computer program generally is defined as a set of instructions that directs a computer operation, although the term actually encompasses several different stages in the problem-solving process a computer follows.

Before one can even begin "programming," one must know how to solve the problem presented and be able to express the solution in detailed steps. The sequence of steps leading to the solution often is referred to as the problem-solving "algorithm."

Once one knows how to solve the problem, the algorithm is displayed in terms of logical units that correspond to the capabilities of the machine on which the problem is to be attacked—the "flow chart."

This "flow chart" is transformed into a "source language" program, a problem-oriented language similar to English or ordinary mathematical notation (examples of such languages are COBOL, FORTRAN, and MAD).

AT PRESENT, THE COPYRIGHT OFFICE ACCEPTS COMputer programs for registration if the effort that went into them constitutes "original authorship" and the copies "deposited for registration consist of or include reproductions in a language intelligible to human beings." If the program has not been published in a form that can be perceived visually, something akin to a printout must be deposited.

In accepting programs, the Office has made it clear that its policy does not automatically mean that they are copyrightable; that question must be resolved by the courts. No distinction is drawn as to the type of program. Any that meet the standard are acceptable. Flow charts and source programs meet all the requirements and readily fit under the categories of "books" or "technical drawings." But it might be difficult under today's law to acquire copyrights for programs on punch cards or magnetic tape because of the rule that a work must be *readable*.

The Revision Bill would eliminate this uncertainty by extending protection to anything that is in a fixed form and perceivable either directly or with the aid of a machine or device.

Hence, protection would extend to programs on punch cards, tape, or any other medium, with no requirement of intelligibility to the eye. The proposed statute also still requires that works be "original works of authorship." and presumably existing concepts of originality and authorship apply.

There is not much question that Congress has the power to give copyright protection to computer programs. The real issue is, should it?

That computer programs should be protected through copyright is, on its face, a strange proposition. Because programs represent algorithmic plans for using machines to achieve practical results, they are poles apart from the conventional subject matter of copyright, which has historically covered such works as novels,

Benjamin Kaplan and Arthur R. Miller, cochairmen of the EDUCOM Task Force on Legal and Related Matters, are, respectively, Royall Professor of Law at Harvard and Professor of Law at the University of Michigan. The Royall endowed chair is the oldest at Harvard for legal studies. Both Kaplan (left) and Miller are natives of New York, and each practiced there before becoming a law educator. Kaplan earned an LL.B. from Columbia in 1933. Miller received his law degree in 1958 at Harvard, where he was a student of Kaplan. Each teaches copyright law.

plays, music, and pictures. Programs differ from more ordinary means of expressing ideas in that one uses the program itself in the execution of the idea.

To use, say, a textbook on cost accounting, one reads the book and then applies the ideas in it to a particular fact situation. To use a source program "explaining" cost accounting, one actually puts the source program into the computer and lets the machine take over. The ideas in the source program can be used only by first converting it into an object program and then using the commands therein to operate upon the fact situation—the raw data.

There was, in fact, very little cogent discussion of computer programs at the meetings under Copyright Office auspices that preceded the submission of draft bills. The same was true of hearings before the Subcommittee which advised the House Judiciary Committee to report a Revision Bill with amendments.

Despite the dearth of discussion or analysis, the Revision Bill, nominally at least, appears to cover computer programs, in all their variety, as subjects of copyright.

Whether on punch cards or tapes or in other forms, programs seem to fit under the Bill's broad definition of copyrightable matter, a definition which includes nearly everything that is associated with authorship and reduced to some fixed arrangement.

Inclusion of computer programs raises the all-important question of the proper scope of protection to be accorded them. Is it intended that the copyright monopoly shall extend to the use of the program in combination with the computer to attain the result at which the program is aimed? For example, is it proposed that the plan or scheme of running a steel mill or handling payrolls by computer shall become the property of the person who holds the copyright on the tapes or punch cards which direct the computer, which in turn directs and monitors the operation?

The Revision Bill does not specifically address itself to this problem, but again we are met with broad statutory language defining the proprietor's exclusive rights. The language could conceivably be read as going the whole length and giving an affirmative answer to the foregoing question—of giving the proprietor of a program the ownership of the process, so to speak, which the program embodies. EDUCOM submits that this possible interpretation should be clearly disavowed.

NO BASIS HAS BEEN LAID FOR LEGISLATION WHICH would take the drastic step of granting monopoly protection to computer programs extending to computer processes. There has been virtually no attempt to examine the economics of the creation or distribution of programs, starting with the question of practical headstart or time advantage that a program maker may now enjoy without statutory protection. He may secure an advantage by staying abreast or ahead of competition and keeping the program "private" through contract or other arrangements. In fact, the industry has burgeoned without the artificial stimulus of the extensive protection that is contemplated by the Revision Bill.

In principle, the vice in granting copyright to computer programs, in the sense of the process, is that it would amount to giving them a breadth of protection similar to that accorded by patent, but without the safeguards and limitations that rightly surround the grant of a patent.

Monopoly of systems, schemes, and the like has been granted by law in the past only under patent, and only upon proof satisfactory to a governmental agency that there has been a real "invention"—a discovery marking a material advance over prior knowledge. Such a monopoly may last only 17 years. Copyright of a computer program, on the other hand, would be available on the basis of "originality," that is, merely an absence of copying without regard to true inventiveness. There would be no serious governmental scrutiny in advance; and the protection would run for a lengthy period (the present period is 56 years; the Revision Bill proposes roughly 75 years).

Bill Threatens Program Field

This kind of easy and broad protection would threaten to tie up the computer program field and inhibit its progress. Had there been such a regime for programs, had programming been contantly carried out under the threat of infringement actions charging plagiarism of existing copyrighted programs, it is doubtful whether the recent growth of programs and programming techniques would have been possible.

Imagine the condition if any sizable fraction of the thousands of existing programs were held in copyright, and copying of the processes involved were civilly actionable and even criminally punishable.

The argument has been made in support of, or at least in apology for, copyright for programs covering the processes that infringement could be avoided simply by changing in some degree the sequence of steps or the problem-solving algorithm of the program. In this view, the presence of a copyright would merely compel an outsider to do some slight work of his own in order to stay out of trouble. The answer to this suggestion is: if copy-

right of process were accepted, (1) it would make no sense to permit escape from it by trivial variation; (2) it is very doubtful that courts would take so lighthearted or permissive an attitude toward the infringement question. The recent tendency of the courts has been to enlarge rather than to contract the range of actionable plagiarism. Surely it would be most imprudent to assume that courts would be especially careful about finding infringement of computer programs, once the basis of protection was established.

It should be added here that the question of patent protection for computer programs is being studied by the Patent Office.

That Office recently published and invited comments upon a set of "guidelines" tentatively proposed for passing on applications for computer-program patents under the present Patent Act. The "guidelines" have been criticized as awkward in that the text of the present Act does not envisage computer programs and the "guidelines" cannot overcome this inadequacy. It may be that the Patent Act would have to be amended to deal more directly with programs. In any event, something on the order of patent appears to be the right legal vehicle if it is believed the public interest requires that further encouragement be given to programming by holding out the prospect of substantial monopoly.

IF THE PROCESS EMBODIED IN A COMPUTER PROGRAM ought not to be aggrandized through copyright, it might still seem plausible to allow a narrower copyright of a program. A narrower copyright could confer on proprietors the exclusive right to replicate the instructions themselves, the content of the punch cards, etc., and the right to bar others from replication, thereby compelling others to buy punch cards, tapes, etc. from him. But it becomes evident that this right must be carefully circumscribed. For if, as we urge, the outsider is to be assured full access to the process—full right to practice the art comprised in the computer program—then he must be given the accompanying privilege to replicate the program.

Put another way, were the copyright owner empowered to bar outsiders from replicating his program, he effectively would deny outsiders the ability to practice the art, for the outsider must replicate the program or something akin to it in order to instruct his own computer.

Yet, the copyright owner might be given the right to prevent others from replicating the content of the punch cards, tapes, etc. simply for the purpose of selling the program on the market or reproducing it in a book on programming. In general, it might not be socially harmful to permit copyright of computer programs limited in scope to replication for purposes other than carrying out the process or practicing the art. Concretely: X prepares a program for controlling the production of steel. A copyright of the program by X (obtained on the basis of "originality") should in no event bar Y, an outsider, from producing steel in the same way, and to that end Y, if he chooses, should be at liberty to replicate X's program exactly. (Of course, Y may prefer to buy the punch cards or tapes from X.)

On the other hand, Y would not be at liberty to replicate X's program simply to sell copies of it to Z; he would not be permitted to enter into a competition with X in any market that may exist for selling the relevant punch cards, tapes, etc. We imagine this sort of limited copyright in X would not be socially harmful, although we frankly do not know whether it would be necessary or useful.

IN THE FOREGOING IT HAS NOT BEEN NECESSARY TO DISTINGUISH the position of nonprofit educational or research institutions or libraries, as producers and users of programs, from that of commercial organizations. The issue is one of general principle. For the reasons to follow, though, we suggest that if new legislation allows computer programs to hold copyright, then educational and similar organizations deserve special privileges or exemptions on liberal lines. In no event should those institutions be subject to *injunction* for infringement of programs.

If such institutions are not exempt, they should have the equivalent of a compulsory license on terms of compensation reasonable for institutions of their kind. There

How to Exempt Educational Uses

is precedent for this no-injunction treatment in certain provisions of the Revision Bill on the use of copyrighted works by community antenna TV systems.

We now turn to the use of "data" as distinguished from programs. As the terms "information storage and retrieval" and "data processing" indicate, information or data can be introduced into computers by being placed in machine-readable form or by some more direct scanning process. They can be manipulated in the computer and can be retrieved (in original or altered form) as hard copies or as transitory images or sounds. What if the material is under copyright? The question centers upon the usage by computers of copyrighted works by

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Oettinger: Danger to Teaching and Research

Anthony G. Oettinger, president of the Association for Computing Machinery, told the Senate Subcommittee on Patents, Trademarks, and Copyrights that the proposed Revision Bill "threatens to cripple severely the very research and the very teaching necessary in order that the 'information storage and retrieval system or any similar device, machine, or process' materialize fully, be understood, and be controllable." Oettinger is a professor of linguistics and of applied mathematics at Harvard. The following is excerpted from his testimony before the Subcommittee:

I wish particularly to express my wholehearted agreement with the perceptive analysis of the problem provided in the statement submitted by the Interuniversity Communications Council (EDUCOM).

I do not wish to repeat arguments that have already been well made by others, particularly since I am not a lawyer. I should rather like to paint for you a picture of what the pertinent sections of this Bill look like to someone, who, like myself, would be directly affected by the consequences.

For a couple of years now, with the support of the Advanced Research Projects Agency of the Department of Defense, I have been experimenting with the classroom use of terminals linked up via 3,000 miles of New England Telephone, Western Union, and Pacific Telephone lines to a computer system devised by my friend and colleague, Professor Glen Culler, at the University of California at Santa Barbara.

Students in several Harvard courses have used this terminal to solve problems in mathematics and statistics as well as to experiment on the design of the system itself with an eye toward producing a more advanced system.

Several facts immediately stand out: transmission is clearly over more than 100 miles; The time and content of the transmission very clearly and necessarily "depend on a choice by individual recipients in activating transmission." I have therefore already run afoul of two of the conditions by which exemption is limited under Section 110 (2) of the proposed Bill.

It would, moreover, be very difficult for me to know whether or not the system my colleague operates 3,000 miles away had or had not incorporated in it programs that were themselves copyrighted or data that were copyrighted and which, under the spirit of the Bill, had in the first place been illegally introduced into the computer.

I am now planning additional experiments over the next three years in which I expect to combine our new computer system with a variety of films, videotapes, audiotapes, and other technical devices as well as the more conventional devices such as chalk and blackboard, books, technical journals, etc.

In the course of these experiments I expect to peruse, display, copy, and enter into computers a great variety of materials. I have as yet no idea how much of what I buy, rent, borrow, or produce myself I will eventually keep and either use in my classroom, publish conventionally or disseminate by less conventional means now still in the experimental stage.

Under the provisions of the Bill as now conceived, I would have not only to acquire and evaluate materials but, in each instance, before experimenting with them, seek out the owner of a copyright, if any, make formal requests for permission to use the material, pay royalties if any are due, etc. All this before any material could actually be used and, in fact, before I could find out whether or not the material was useful! The delays, the frustrations and the chaos inherent in such a process now seem so formidable that if the Bill were passed in its present form I would be tempted to return to the safer occupation of copying out manuscripts with a goose quill pen.

I am interested in the free development of the science and the engineering of both computer hardware and computer software but, as an author, I am not unmindful of the protection afforded by copyright.

Yet, the logic of permitting someone to cut up his legally purchased copy of a book I have written, paste pieces on file cards and sort these by hand while precluding him from doing the same job by machine escapes me. I am concerned if he makes illegal use of the end product, but surely I have as little right to tell him not to use the labor-saving assistance of a computer as I have to forbid him to delegate work to a research assis-

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reproduction, performance, and so forth. Our particular interest is to consider what the Bill should provide if such operations are conducted by nonprofit schools or similar institutions.

There has been comparatively little experience with, or practical application of, these computer uses. The range of eventual uses, as well as the technology for accomplishing them, still is largely a question mark.

The traditional policy of our Copyright Act has been to exempt public performances of nondramatic literary and musical works from copyright restrictions when the performances are carried on without a motive of profit. By interpretation, the nonprofit public display of works probably is similarly exempt. These "traditional exemptions" are intended to benefit educational and other such institutions.

Two points need stress. First, these exemptions do not imply that educational institutions or libraries are relieved of all copyright tolls. In fact, these establishments pay vast and ever growing sums for copyrighted works. Consider, for example, the size of the expenditures for copyrighted books. Regardless of the final fate of the computer, there is no prospect of any slackening of such financial contributions in the foreseeable future. On the contrary, education and associated endeavors will be paying more, not less, for copyrighted works.

Second, the traditional exemptions, so far as they favor education and similar undertakings, are not a sentimental or quixotic or irrational kind of largesse which the law unjustly forces copyright proprietors to bestow. Rather they are grounded in enlightened policy.

The law helps to assure an adequate and lively production and distribution of intellectual works by enhancing artificially the returns from distribution. But it serves no public purpose, and is indeed pernicious, to attempt undue enhancement of those returns. Thus, the monopoly rights conferred by the law should be held in reasonable check both as to scope and duration.

It is peculiarly fitting that the outer limits of the copyright monopoly should be drawn to benefit education and libraries. Not only is education intrinsically worthy of encouragement but it creates and constantly enlarges the very audience upon which the copyright industries depend for their market, besides helping to supply the authors who furnish the basic material for those industries.

Also, it may be observed that since funds for education always are running short, schools would tend, if the traditional exemptions were withdrawn, to avoid the performance and display of copyrighted works when possible and turn to works which could be used without compensation. This might both affect undesirably the selection of works and reduce the profits that the publishers hope to achieve through withdrawal of the traditional examples. The copyright industries—the "publishers" in the broad sense—seem to have gotten along rather well under the long-standing statutory arrangements granting traditional exemptions. Nevertheless, the publishers have insisted throughout the evolution of the Revision Bill on erasing these exemptions.

Sometimes this insistence has been so strident as to disregard the plain fact that the publishers are themselves the beneficiaries of like preferences, whether these take the form of postal subsidies, appear in the guise of public funds appropriated directly or indirectly for the purchase or licensing of copyrighted works, or take the shape of the copyright status which confers on them the basic monoply.

When the revision effort began, the register of copyrights advised that the traditional exemptions be continued. But, amid a great welter of propaganda, the register has gradually swung around. The result is that the Revision Bill abandons the old line and substitutes particularistic exemptions of narrower scope. As we shall see in more detail, the cutting down of the traditional exemptions operates with special strictness and with serious effect on schools and libraries desiring to use the advanced technology represented by the computer.

THE PUBLISHERS ARE UNDERSTANDABLY CONCERNED that computer operations by schools and libraries may radically change the impact of the traditional exemptions. For example, if "displays" by computers eventually become facile enough to reduce the need for books, the book publishers might be harmed by the operation of the relevant traditional exemption, at least until they could adjust themselves and find a place in the new technology.

But the future of computer uses of copyrighted works by schools and the like is uncertain, and is likely to remain so for some time. A repressive attitude, written into permanent legislation, might prove stultifying.

Moreover, the narrowing or elimination of the traditional exemptions, forcing schools and libraries to seek "clearance" of rights on payment of fees, is and must for some time remain impracticable in the absence of clearing-house devices (apart from those available for music) for negotiation of permissions and fees.

In these circumstances, it would have seemed advisable for the Bill to hew to the line of the traditional exemptions, but to establish a procedure for reviewing and resolving the question when the shape of the future could be better discerned. This might have involved the establishment of an administrative body with appropriate

delegated power, or some other self-corrective mechanism. The Revision Bill does not adopt this approach.

IF FIRM DECISIONS ARE TO BE MADE NOW IN THE NEW legislation, then the particular dispositions of the computer questions should be thoroughly reconsidered.

They were little debated before they emerged in the Bill, and were reached by guess and by hunch. They seem to eliminate virtually all preference for educational institutions that utilize copyrighted works by means of computers.

Assuming that the exact line of the traditional exemptions is to be abandoned, and concessions made to publishers, it still appears that the Revision Bill goes too far and makes undue concessions. In effect, it would give the publishers the economic benefits promised by the future improvement of computer technology. Plainly those economic benefits should be equitably shared, not delivered to the publishers alone.

This one-sided appropriation is especially unfair when it is realized that publishers as a group are no more to be credited with the creation of the technological improvements than are schools and libraries.

Examining the Revision Bill in detail, we find that the exemptions granted to schools and libraries for computer operations with copyrighted works have been reduced to the point at which they are nominal rather than real.

THE BILL WOULD ALLOW AN EXEMPTION FOR "PERformance" or "display" of copyrighted works by instructors or pupils in face-to-face teaching in nonprofit schools when carried out in classrooms or similar places devoted to instruction.

The meaning of this is not clear. The text of the section, the commentary in the House Report, and the history of the provision suggest that the draftsmen had in mind only performances and displays by means of the projections long familiar in classrooms, and not computer-assisted classroom performances.

A question also is raised whether the exemption, if applicable to computer-assisted instruction at all, covers only cases where the images and sounds are delivered simultaneously to all students in a classroom, and not those where the signals are called forth by individual students at their own rates of speed.

Loss of the face-to-face exemption where there is individualized activation of the machine would be unfortunate, for this element is often the essence of instruction by computer and may be its cardinal advantage. The confinement to the "classroom" and the requirement that an instructor be present run against the healthy trend of the new methods designed to break the stultifying limitations imposed by classrooms. Finally, and very important, the face-to-face exemption is rendered largely nugatory if a "transmission" is involved, *i.e.,* if the images or sounds are received beyond the "place" from which they are sent. If the computer is located outside the "place" in which the classroom is housed (and why should it not be?) presumably there is an infringement, subject, however, to the possibility that the very narrow "transmission exemption" may apply.

THE "TRANSMISSION EXEMPTION" IN THE BILL THE Senate is considering covers the transmission of nondramatic literary or musical works or display, if these are part of the systematic instruction of a nonprofit school, and the radius of the transmission is not more than 100 miles.

The transmission must be made primarily for reception in classrooms or similar places, and the time and content must be controlled by the transmitting organization and "not depend on a choice by individual recipients in activating transmission from an information storage and retrieval system or any similar device, machine or process."

Geographic Limit On Transmission

Obviously this exemption was drafted with educational television in mind. The reference to computers, with the provision against individual activation, appears to have been thrown into the latest version of the Bill as a kind of appendage.

The effect, however, is virtually to read this exemption out of the Bill as it would apply to computerized instruction.

Reflexively it also does great damage to the face-to-face exemption when the computer is at a distance from the classroom.

As already noted, individualization (activation by recipients at their own speeds) is vitally important to computerized instruction, and this falls outside the exemption.

Again the reference to classrooms is too confining. Finally, it is arbitrary to speak of a fixed radius of transmission (presumably to be measured as the distance between the computer proper and its console or terminal facility). The exemption's evident bias against computer "networks" is unexplained and hard to justify.

Although the Bill passed by the House is more liberal concerning educational television, in that it does not limit the radius of transmission, it excludes the use of com-

puters from the exemption and thus has the same practical effect as the Senate Bill.

It will be noted that the two exemptions so far considered relate to teaching. There is no specific exemption for research or library activities by means of computer, an omission that would have drastic effects. Take libraries. Today a library of course pays for the books that are found on its shelves, but ordinarily neither the library nor the reader must make any additional copyright payment to use them, whether by simple perusal on the premises or in lending out. (The register of copyrights has refused to support any toll for lending out.)

The Revision Bill would introduce a diametrically opposite principle by which even intermittent displays of books through machines in libraries might be infringements. This 180-degree turn of position is, in our view, not defensible. The indeterminate "fair use" provision is not an acceptable substitute for a clear-cut and reasonably delimited exception.

SUCH NARROW BENEFITS AS THE EXEMPTIONS WOULD otherwise confer appear to be frustrated by the proposition, advanced in the House Report, that the "input" of a copyrighted work into a computer—involving its translation into machine-readable form—is itself an infringement regardless of the manner of the input or the further utilization of the work.

An infringement thus may occur at the moment a copyrighted work is introduced into a computer, even if the only utilization later made of it falls squarely within one of the exemptions. So, the Revision Bill, having ceremoniously conferred the alleged exemptions with one hand, brusquely takes them back with the other; indeed, it takes them before they are really given. The performances and displays of copyrighted works as described in the exemptions are not free as far as computer operations are concerned—not truly exempted—when payment can be exacted at the threshold or access to the copyrighted works can be denied altogether by the copyright proprietors.

With respect to input, the Bill is harsher toward computers used for education than toward educational broadcasting. In the case of educational broadcasting, an additional exemption allows "ephemeral recordings" of "transmission programs" that embody the performances and displays of copyrighted works.

It has been suggested that the copyright proprietor must be able to control the introduction of the work into the computer because the computer has great flexibility. While the work is "in" the computer, there is no assurance of its being availed of only in the exempted ways. But it is surely a novel prescription to the blocking of access in order to prevent possible future theft. Moreover, the protection is illusory. Anyone who intends to infringe a work without payment would not hesitate to make the input without notice or payment to the proprietor. We should add that the computer can be set up to keep records, for billing purposes, of its manipulation of a copyrighted work.

Our objection to making input an infringement without regard to the nature of subsequent uses does not mean that we would oppose a blanket licensing of works for all-purpose computer utilizations. Where any nonexempt utilization of the work is contemplated, the practice may well become the regular mode.

It has also been argued that a copyright owner is entitled to the exclusive right to translate his work into machine-readable form. If, indeed, he has prepared it in a form suitable for use directly by the computer, the chances are very good that an institution will buy that

Input Could Be An Infringement

product rather than go to the expense of putting the material in the necessary form. But there will be cases where the proprietor is not interested in making the transformation, and institutions must have access to the work in order to take the benefit of the exemption.

Of course, any exemption of the input *as such* should be lost if the work is thereafter used, without consent, in excess of the applicable statutory exemptions on use. So, in revising the current bill, technical advice might be sought on the feasibility of prescribing that after a work is inputted and used for exempt purposes, it must be removed from the machine.

At some stage, it may become possible technically to require that inputs, even if themselves exempt, shall be reported to an official register. The important point is that input should not constitute an infringement when the uses made are exempt; otherwise the so-called exemptions are completely aborted.

WE HAVE SHOWN THE SERIOUS INADEQUACIES OF THE exemptions related to computer operations. Understandably concerned about the potentialities of such uses of copyrighted works, the draftsmen of the Revision Bill have, in effect, gone to the extreme of shutting off nearly all substantial preferences for educational, research, and library purposes.

A more equitable line must be found. Consideration probably should start by seeing how far it is fair and feasible to hold to the general line of exempting performances or displays of works for teaching, research, or

library purposes in face-to-face situations and in closed transmissions controlled by nonprofit educational and similar organizations.

The line of exemption should not be twisted by harassing or frustrating limitations, such as an insistence that to retain exemption transmissions must be activated by the transmitting organization rather than the recipients.

In all events, the remedy of injunction should not be available against educational or like users. In disputes over terms as to a nonexempt use, a reasonable rate should be paid, as determined as a last resort by a court, taking into account, among other relevant factors, the nature of the using institution. Such a provision will serve, collaterally, the benevolent purpose of encouraging the creation of satisfactory clearing house arrangements for licensing copyrighted works.

In recognition of the fact that the entire situation is fluid, and that lines drawn in the statute may turn out to be too favorable to education and similar interests or not favorable enough, the new law should contain internal machinery for correction. To that vital subject we now turn.

The House report candidly admits that "the problem of computer uses of copyrighted material" was "touched on rather lightly at the hearings." Nevertheless the Subcommittee, later the full Committee, and then the full House went on to lay down comprehensive restrictions on computer uses, and all this without creating internal statutory machinery for correction later. With deference, we say that this was a mistake.

The House Report goes no further than to recognize that the absence of any clearance systems outside the music field is serious. As to that, it makes only a weak proposal that the interested parties should try to reach some accommodations *after* the Bill is enacted. Even here it does not draw the obvious inference: provision against injunctive relief is indispensable as long as a viable clearance system does not exist. It must be conceded that the computer field is subject to rapid change, that regulations now adopted may, and indeed very likely will, prove later to be foolish. The entire environment is changing.

It is hazardous to rely on the usual process of formal legislative amendment to correct abuses as they arise. Experience with a number of provisions in the present Copyright Act has definitely shown that such reliance is illusory. In the copyright field, abuses are advantages seen from the other side; they are fiercely defended by the favored groups and become extremely hard to dislodge.

Some procedure should be found to supply the element of self-correction; otherwise the Revision Bill will be obsolete on the day it is enacted. Any one of a number of devices could be adopted. One could consist of the establishment under the law of an administrative body with appropriate delegated power. It could consist of a body authorized to amend or add to the legislation, subject to Congressional veto. Or, it could consist of an advisory council directed to keep the subject under consideration, study the problems as they come up, and report to a Joint Congressional Committee, with the Committee then making proposals for consideration by Congress.

One or another of the described devices may be useful for purposes beyond that of accommodating the law to the changing panorama of the computer. For example, the Revision Bill relegates the problem of photocopying to the general language of the section on "fair use."

Greater clarity should be sought. Thus it may be well to provide for the possibility of laying down from time to time, on the basis of experience, definite rules-of-thumb for photocopying.

Whatever may be the need in that quarter, an adjunct to the statute is clearly and urgently needed for the solution over a period of time of the copyright questions generated by the computer.

Oettinger: Danger to Teaching CONTINUED

tant or a secretary. The foregoing was all stated in the first person and with very specific reference to my own interests. Nevertheless I am familiar enough with the work of my colleagues in computing, libraries, and information retrieval to believe that I could quite safely have said "we," substituted innumerable variations on the general theme of educational technology or switched altogether to the broader problem of library modernization. What I have said would still remain true. Beyond my immediate personal concerns, I can see other curious and perhaps earlier unforeseen consequences of the limitations of Section 110 (2). One could argue, for example, that programmed instruction of the linear kind where each student is presented with precisely the same sequence of questions as every other, could legitimately take place if time and content of transmissions were controlled by the transmitting organization. However, the use of branching instructional programs where the

future course of instruction, the nature of questions and so on depends on prior responses by the student might well constitute "a choice by individual recipients in activating transmission" and therefore an infringement!

There is still considerable controversy among investigators of these modes of programmed instruction as to which is more effective and in what circumstances. It would be a rather curious precedent in our society and I need hardly say an unfortunate one, to have scientific questions decided *a priori* by legislation.

A look slightly ahead of us may further help in seeing the relevant provisions of the Bill in some perspective. There now exist machines that can scan printed material of limited type fonts, and convert it into machine readable form. There also exist experimental means for taking words stored in a computer and converting these into the sounds that would be heard if a person were to pronounce the words. If such processes were perfected and extended even in a limited form, one could visualize a prosthetic device which would enable a blind man to turn any book into a talking book without the delays and difficulties attendant on conversion into Braille or on recording by a volunteer reader.

We would then face the anomaly that a normal man who has purchased a book in a bookstore or borrowed it from a library would be within his full rights in reading this book anytime and anywhere he pleased; but, if I read the provisions of the Bill correctly, that a blind man using his prosthetic machine might well be infringing a copyright:

(a) by causing his prosthetic machine to translate print into machine-readable form, whether or not transmission to a remote computer is required. If transmission were necessary, as is much more likely initially, then there might be further infringement;

(b) by his exceeding the capricious 100-mile limit (Section 100 (2)B), which would be probable since the necessary computers most likely could be provided economically only at a limited number of regional centers; [or]

(c) through his exercising his choice as an individual recipient "in activating transmission from an information storage and retrieval system" or, as the Bill goes on, "any similar device, machine, or process."

The problems which my colleagues and I are trying to solve range in interest and applicability from the purest of theoretical investigations to the most immediately applicable design and engineering work.

In a sense, however, we are the victims of our own rosy predictions. The proposed Bill drastically limits traditional exemptions, although there is no clear and present danger of infringements.

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